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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/453,772 12/03/99 SUZUKI Y 3045-2339

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MM91/0328

EXAMINER

PEREZ, G

ART UNIT

PAPER NUMBER

2834

DATE MAILED:

03/28/00

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/453,772

Applicant(s)

SUZUKI ET AL.

Examiner

Guillermo Perez

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claims ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☒ All b) ☐ Some * c) ☐ None of the CERTIFIED copies of the priority documents have been:
1. ☒ received.
2. ☐ received in Application No. (Series Code / Serial Number) ____.
3. ☐ received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. & 119(e).

Attachment(s)

- 14) ☒ Notice of References Cited (PTO-892)
- 15) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 16) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 17) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 18) ☐ Notice of Informal Patent Application (PTO-152)
- 19) ☐ Other: _____.

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DETAILED ACTION

Specification

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: ---Actuator with Stator Teeth Number Equal to Rotor Poles Number---

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1, 3, 7 and 9 to 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komatsu (U.S. Pat. No. 4, 656, 381) in view of Fujitani et al. (U.S. Pat. No. 4, 891, 567).

Komatsu discloses a claw pole type actuator of a single-phase structure (figure 25), comprising:

a stator yoke composed of a pair of substantially circular planar yokes (112, 115) formed of a soft magnetic material;

polar teeth (113) which axially protrude from inner peripheral edges of the respective planar yokes and which are disposed to face each other, extending in an axial direction;

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and a cylindrical ring (112b, 115b) provided on outer peripheral edges of one of said planar yokes;

an armature (120) being constituted by installing a coil (118) formed by winding a magnet wire in a coil receiving section (119) shaped like an annular recess formed by said planar yokes, said polar teeth, and said cylindrical ring of said stator yoke;

and a stator assembly which has flanges (121, 122) with bearings provided on both end surfaces of said armature and in which a rotor (110) provided with a magnet for a magnetic field composed of a permanent magnet being installed to face said polar teeth of said stator with a minute gap provided therebetween;

wherein a pair of stator yokes, each being composed of said planar yoke and said cylindrical ring that are combined into one piece, are disposed to face each other;

wherein a pair of stator yokes, each being composed of said planar yoke and said cylindrical ring that are combined into one piece, are disposed to face each other;

said flanges are composed of a nonmagnetic material column 11, lines 64 to 65). However, Komatsu does not disclose that a number of said polar teeth equals a number N of rotor magnetic poles; nor that the extensions of said two polar teeth in a circumferential direction are all the same and stay within a range of $220/N$ to $260/N$ degrees at central angle.

Fujitani et al. disclose that a number of said polar teeth equals a number N of rotor magnetic poles (figure 3); and that the extensions of said two polar teeth in a circumferential direction are all the same and stay within a range of $220/N$ to $260/N$

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degrees at central angle (column 4, lines 28 to 35) for the purpose of providing a high performance electric motor.

It would have been obvious at the time the invention was made to modify the claw pole type actuator of Komatsu and provide it with a number of said polar teeth equal to a number N of rotor magnetic poles; and the extensions of said two polar teeth in a circumferential direction being all the same and stay within a range of $220/N$ to $260/N$ degrees at central angle as disclosed by Fujitani et al., for the purpose of providing a high performance electric motor.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide maximum torque when a coil is in a deenergization mode between $T_{rate}/4$ and $3 T_{rate}/4$ (where T_{rate} denotes a maximum torque value obtained when a rated current is passed) since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

2. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Komatsu in view of Fujitani et al. and further in view of A. W. Haydon (U.S. Pat. No. 3, 495, 113).

Komatsu and Fujitani et al. disclose a claw pole type actuator as described on item 1 above. However, Komatsu nor Fujitani et al. disclose that said stator yoke is comprised of a first stator yoke in which a planar yoke and a polar tooth are combined into one piece, and a second stator yoke in which a planar yoke, a polar tooth and a

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cylindrical ring are combined into one piece, nor that said polar teeth of said first and second stator yokes, respectively, are disposed at an spacing of approximately 180 degrees in terms of an electrical angle.

A. W. Haydon discloses that said stator yoke (figure 6) is comprised of a first stator yoke (112) in which a planar yoke and a polar tooth (112a) are combined into one piece, and a second stator yoke (111) in which a planar yoke, a polar tooth (111a) and a cylindrical ring are combined into one piece, and said polar teeth of said first and second stator yokes, respectively, are disposed at a spacing of approximately 180 degrees in terms of an electrical angle for the purpose of improving structure and minimize the number of parts in the motor assembly.

It would have been obvious at the time the invention was made to modify the claw pole type actuator of Komatsu and Fujitani et al. and provide it with a stator yoke being comprised of a first stator yoke in which a planar yoke and a polar tooth are combined into one piece, and a second stator yoke in which a planar yoke, a polar tooth and a cylindrical ring are combined into one piece, and said polar teeth of said first and second stator yokes, respectively, being disposed at an spacing of approximately 180 degrees in terms of an electrical angle as disclosed by A. W. Haydon, for the purpose of improving structure and minimize the number of parts in the motor assembly.

3. Claims 4 to 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komatsu in view of Fujitani et al. and further in view of Takeuchi et al. (U.S. Pat. No. 4, 899, 073).

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Komatsu and Fujitani et al. disclose a claw pole type actuator as described on item 1 above. However, Komatsu nor Fujitani et al. disclose that a rotation of said rotor is restricted by a stopper so that a maximum angle of the rotational motion stays within a range of $120/N$ to $240/N$ degrees; nor that said stopper is incorporated in said actuator.

Takeuchi et al. disclose that a rotation of said rotor is restricted by a stopper (10) so that a maximum angle of the rotational motion stays within a range of $120/N$ to $240/N$ degrees (column 7, lines 61 to 68 and column 8, lines 1 to 42); and that said stopper is incorporated in said actuator for the purpose of providing an improved motor for detention torque and drive torque irrespectively of size and weight by bringing out the maximum of action of the rotor and field pole.

It would have been obvious at the time the invention was made to modify the claw pole type actuator of Komatsu and Fujitani et al. and provide it with the rotation of a rotor being restricted by a stopper so that a maximum angle of the rotational motion stays within a range of $120/N$ to $240/N$ degrees; and said stopper being incorporated in said actuator as disclosed by Takeuchi et al., for the purpose of providing an improved motor for detention torque and drive torque irrespectively of size and weight by bringing out the maximum of action of the rotor and field pole.

4. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over

Komatsu in view of Fujitani et al. and further in view of Yamaguchi et al. (U.S. Pat. No. 5, 373, 207).

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Komatsu and Fujitani et al. disclose a claw pole type actuator as described on item 1 above. However, Komatsu nor Fujitani et al. disclose that a groove or a cut for destroying magnetic balance is provided in an axial direction on a central portion of one of south pole and north pole of said magnet for magnetic field.

Yamaguchi et al. disclose that a groove or a cut (figure 9) for destroying magnetic balance is provided in an axial direction on a central portion of one of south pole and north pole of said magnet for magnetic field for the purpose of providing a motor without an output shaft nor external eccentric weight.

It would have been obvious at the time the invention was made to modify the claw pole type actuator of Komatsu and Fujitani et al. and provide it with a groove or a cut for destroying magnetic balance being provided in an axial direction on a central portion of one of south pole and north pole of said magnet for magnetic field as disclosed by Yamaguchi et al., for the purpose of providing a motor without an output shaft nor external eccentric weight.

5. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Komatsu in view of Fujitani et al. and further in view of Morril (U.S. Pat. No. 5, 260, 620).

Komatsu and Fujitani et al. disclose a claw pole type actuator as described on item 1 above. However, Komatsu nor Fujitani et al. disclose that air gaps in a radial direction formed by said polar teeth and said rotor magnet are uneven, nor that air gaps

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at central portions of said polar teeth are narrower than air gaps at ends of said polar teeth.

Morril discloses air gaps (figure 5) in a radial direction formed by said polar teeth (16) and said rotor magnet are uneven, and air gaps at central portions of said polar teeth are narrower than air gaps at ends of said polar teeth for the purpose of improving torque, speed and efficiency in the motor.

It would have been obvious at the time the invention was made to modify the claw pole type actuator of Komatsu and Fujitani et al. and provide it with air gaps in a radial direction formed by said polar teeth and said rotor magnet being uneven, and air gaps at central portions of said polar teeth being narrower than air gaps at ends of said polar teeth as disclosed by Morril, for the purpose of improving torque, speed and efficiency in the motor.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Guillermo Perez whose telephone number is (703) 306-5443. The examiner can normally be reached on Monday through Thursday and alternate Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nestor Ramirez can be reached on (703) 308-1371. The fax phone numbers for the organization where this application or proceeding is assigned are (703)

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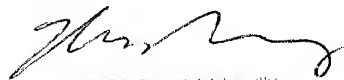
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305-3432 for regular communications and (703) 305-3432 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

GP
March 17, 2000


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